

- b) a telescopic steel liner stub closed at its lower end by a drillable metal plate plugging each window, and machined at both ends to conform respectively with the outer surface of the casing window for the lower end and with the inner surface of the casing window for the upper end,
- c) two drillable metal guide cages supporting said stub, inclined at the kick-off angle, with one of the two guide cages affixed inside the casing joint by drillable fasteners while the other, freely inserted into the stub, is mobile and can slide within said fixed guide over an interval equal to a fraction of the stub length,
- d) a drillable gasketed collar affixed to the stub's upper end to prevent said telescopic stub's upper end from popping out through the window into the reamed cavity when the stub is extended by increasing the hydraulic pressure in the casing with respect to that of the annulus during cementation of the casing string and of each extended stub, with a cement slurry displaced behind the casing and wherein said gasketed collar presents at least one guiding key or groove sliding along a bar of the fixed guide cage, to prevent any rotation of the stub around its axis,
- e) a steel liner inserted in a drainhole drilled through such a liner stub, permanently hung by a dual hanger's opposing slips into said stub and sealed with a high-temperature pressure-sealing device, in addition to thermal cement,
- f) a tubing completion assembly, conveying production fluids from a drainhole to the surface and steam from the surface to a drainhole, having at its lower end a heat-resistant, pressure-tight, multiple-breakable-sealed connecting device wherein telescopic connector steel tubes inclined at the kick-off angle are facing each window, with the tube's lower end equipped with a high-temperature sealing device insertable into the upper part of the window's stub and set when said connector tube is in its extended position, whereas the upper end of said tube is equipped with a movable sliding seal remaining within a cylindrical cavity of said tubing completion assembly,
- g) a hydraulically-operated slot-cutting tool for selectively perforating the uncemented lower part of each drainhole liner.
4. The apparatus for completing a multi-branch cased well of claims 1, 2 or 3 wherein the hydraulically-operated slot-cutting tool comprises:
- a) a cylindrical tool body inserted into said drainhole liner wherein a plurality of cutting wheels, each one mounted on a perpendicular axis to that of said body, at the end of an hydraulically-operated articulated arm, are periodically pressed into the inner surface of said liner wall, which they penetrate, by large forces applied only when the arms are extended by the displacement of a spring-loaded hydraulic piston sliding in a pressurized liquid-filled cylinder,
- b) a source of periodic hydraulic fluid pressure at the surface,
- c) a coiled tubing of smaller diameter than that of said drainhole liner, connecting said cylindrical body to said pressure source and providing a mechanical link to the surface, to insert and pull-out the tool body through the liner, thus causing each cutting wheel to cut a slot into the liner wall, substantially parallel to the axis of said liner, while the arms are kept in their extended position, but leaving the liner wall intact when the arms are

- brought into their retracted position along the tool body.
5. The apparatus for completing a multi-branch cased well of claim 3, wherein the tubing completion assembly comprises a multiple-breakable-sealed connecting device presenting at least two slightly inclined fixed branches, each one terminated by a connector tube assembly equipped at its end with a known sealing device, taken from a list comprising: thermal packings, O rings and metal/metal seals, to provide a breakable pressure-seal against the inner surfaces of said casing/liners's connecting device;
- said connector tube assembly comprises:
- a) a cylindrical body with its upper end connected to a tubing and forming with said tubing an angle equal to that formed by the casing/liner connecting device and the casing, and said upper end equipped with anchoring means to fasten it to the inner surface of the casing,
- b) a connector steel tube sliding through said cylindrical body under the surface-controlled pressure of a hydraulic fluid which also compresses a spring against an arrestor ring, to provide a spring-loaded, high-temperature end seal of said connector tube when in its extended position,
- c) a wireline-releasable mechanical latch maintaining said spring under compression after the hydraulic pressure has been released.
- d) means for latching a suitable retrieval wireline tool to the tail end of said connector tube to retract it and to latch it into said body in its retracted position, in the event that the whole tubing completion assembly has to be pulled out for inspection or repairs,
- e) a packing-type, high-temperature lateral seal in the annulus between said cylindrical body and the tube within said connector tube assembly, providing a breakable pressure-sealed flow connection between said liner and said tubing.
- f) a packing-type, heat-resistant seal around said connector tube, above said end seal, providing an additional pressure-seal against the inner surface of the casing/liner connecting device in which the connector tube is inserted.
6. The apparatus for completing a multi-branch cased well according to claims 1, 2 or 3 further comprising a downhole pump and means for preventing pump cavitation and gas lock in the tubing completion assemblies, when they convey gassy or boiling production fluids to the surface;
- said means comprising:
- 1) a vertical sump, closed at its top by a conventional multi-string tubings/casing packer and connected to said multiple drainholes, and wherein the absolute flowing pressure of said produced fluids, at the point of highest elevation in the flow path from the drainholes to said sump, may drop below the bubble point absolute pressure of said fluids, a situation resulting in gases being evolved or coming out of solution to form a gas pocket which interrupts the flow of liquids from said drainholes into the sump pump,
- 2) a wireline-retrievable gas-purging device suitable for latching into the short string of the multi-string packer located at the top of the sump, wherein said device is taken from a downhole equipment list comprising:
- a) a normally closed subsurface valve whose opening is controlled by a fluid level sensor at the top of said oil sump to periodically purge into the compartment above said packer any gas phase accumulating above a predetermined fluid level depth,

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- b) a wireline-retrievable plug in said packer, comprising a permselective membrane permeable to diffusing gas but impervious to liquid flow, for continuously purging of said gas phase, under a gas pressure gradient,
 - c) a venturi in the pump-discharged liquid production stream flowing through a string adjacent to said plug in said multi-string packer, at its exit into an enlarged flow cross section above said packer, which is equipped with a gas flow connection between the side of said venturi and the upper face of said membrane, to create said gas pressure gradient.
7. A method for drilling and completing a multi-branch cased well for oil recovery by sequential cyclic steam injection methods and for petroleum production from non-uniformly pressured heterogeneous reservoirs through medium-curvature, liner-equipped, horizontal drainholes, wherein casing/liner connections are permanently-sealed, wherein liner/tubing are connected by breakable-seals, and comprises the following steps:
- a) drilling a pair of short deviated boreholes through the bottom of said vertical well casing,
 - b) inserting in said pair of drainholes two short intermediate steel liners using a work string ended with an inverted Y nipple joint, two articulated nipple joints, each one equipped with a rubber cementing seal cup, and holding said intermediate liner with a releasable latch,

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- c) stab-in cementing of said two short intermediate liners using said work string as cementing string, with sufficient overlap of a special high-temperature resin cement in the casing to provide a permanent gas-tight thermal tie-in of the casing with each intermediate liner,
- d) drilling successively each drainhole through each intermediate liner,
- e) running a coiled-tubing steel liner through each said intermediate liner into said drilled drainhole, affixing it to the intermediate liner with a dual hanger's opposing slips and with a high-temperature pressure-sealing device prior to cementing its upper end to the intermediate liner's lower end, with a known thermal cement,
- f) connecting the upper part of each intermediate liner to the lower end of a tubing assembly equipped with a heat-resistant pressure-tight, multiple-breakable-sealed connecting device,
- g) selectively perforating the uncemented lower part of said coiled tubing liner "in situ" using a hydraulically-operated slot-cutting tool at the end of a smaller-diameter coiled-tubing run-in from the surface and inserted through said tubing assembly and intermediate liner into said drainhole liner.

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